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EV 406 074 696 US

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm or Individual name	Harness, Dickey & Pierce, P.L.C.	Attorney Name Paul A. Keller Bryant E. Wade	Reg. No. 29,752 40,344
Signature			
Date	March 10, 2004		

CERTIFICATE OF MAILING/TRANSMISSION

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Signature		Date	March 10, 2004

证 明

本证明之附件是向本局提交的下列专利申请副本

申 请 日： 2002 09 10

申 请 号： 02 2 64324.9

申 请 类 别： 实用新型

发明创造名称： 行程开关

申 请 人： 苏州宝时得电动工具有限公司

发明人或设计人：陈少东

中华人民共和国
国家知识产权局局长

王景川

2003 年 6 月 25 日

权 利 要 求 书

1、一种行程开关，其特征在于：它包括固定盘、转动盘，转动盘的轴心处固定有转动轴，转动轴与固定盘可转动连接，所述的固定盘上固定有相间隔的第一电接点、第二电接点，簧片的一端部固定在其中的一个电接点上，簧片的中部依靠弹力抵压在转动盘的圆周边缘上，簧片的另一端部与另一个电接点有两种工作位置，第一工作位置是簧片的另一端部与另一个电接点相接触，第二工作位置是簧片的另一端部与另一个电接点相分离；所述的转动盘的圆周边缘上设有径向的凸起或凹陷，在簧片的中部遇到所述的凸起或凹陷时，所述的簧片的另一端部的工作位置发生变换。

2、根据权利要求1所述的行程开关，其特征在于：所述的转动盘的圆周边缘上设有一个凹陷的缺口，所述的簧片的中部为与凹陷缺口相吻合的弯折状，在簧片的另一端部与另一个电接点相接触时，所述的簧片的中部上的弯折部陷入所述的缺口内。

3、根据权利要求1所述的行程开关，其特征在于：所述的固定盘为蜗轮，该蜗轮啮合在蜗杆上，所述的蜗杆枢轴设置于基架上，而转动轴也与该基架枢轴连接。

4、根据权利要求1所述的行程开关，其特征在于：所述的固定盘有两个，分上下两层同轴设置；蜗杆也为两个，分别与两个固定盘相啮合。

说 明 书

行程开关

技术领域

本实用新型涉及一种车库门上使用的行程开关。

背景技术

现有技术中，US4147073 提出用可逆电机使主螺杆可逆旋转，螺杆驱动其上的螺母滑块轴向移动，滑块连接到门上，第二螺杆同轴连接到主螺杆上且螺距很小，其上的开关撞块只轴向移动，在第二螺杆的两端有可调位的行程开关，连接两开关到马达上，用来控制马达的可逆旋转，使门上下移动实现开关门。US5299678 提出用限位开关机构以控制开门器电机的转动，使门在一定范围内移动，它包括一个马达驱动的螺杆，螺杆上至少装有一个开关撞块，并可调位置，在螺杆旋转时，开关撞块不随螺杆转动而只轴向移动。近螺杆处安装有限位开关，以便在螺杆旋转时，撞块在螺杆上轴向移动，触发限位开关，实现电机的停转。这种两种行程开关远距离地设置于螺杆的两端，因此不便于集中调节其行程位置，另外这两种行程开关为直线行程开关，不能直接控制主螺杆的行程。

发明内容

本实用新型的目的在于提供一种可以通过转动直接控制行程位置的行程开关。

本实用新型的技术方案是：一种行程开关，它包括固定盘、转动盘，转动盘的轴心处固定有转动轴，转动轴与固定盘可转动连接，所述的固定盘上固定有相间隔的第一电接点、第二电接点，簧片的一端部固定在其中的一个电接点上，簧片的中部依靠弹力抵压在转动盘的圆周边缘上，簧片的另一端部与另一个电接点有两种工作位置，第一工作位置是簧片的另一端部与另一个电接点相接触，第二工作位置是簧片的另一端部与另一个电接点相分离；所述的转动盘的圆周边缘上设有径向的凸起或凹陷，在簧片的中部遇到所述的凸起或凹陷时，所述的簧片的另一端部的工作位置发生变换。

本实用新型与现有技术相比具有下列优点：

通过转动转动轴，使得转动盘与固定盘之间的相对位置发生改变，则使得第一电接点、第二电接点之间发生断开或连接，起到行程开关的作用，适用于转动限位。

附图说明

附图 1 为本实用新型的结构主剖视图；

附图 2 为本实用新型的外观右视图；

附图 3 为附图 1 的 A-A 方向剖视图；

附图4为附图1的A1-A1方向剖视图；

附图5为附图1的A2-A2方向剖视图；其中：

[1]、基架；[2]、下蜗杆；[3]、上蜗杆；[4]、转动轴；[5]、上蜗轮；[6]、下蜗轮；[7]、转动盘；[8]、簧片；[9]、缺口；[10]、簧片凸起；[11]、第一电接点；[12]、第二电接点；

具体实施方式

参见附图，一种行程开关，它包括固定盘、转动盘[7]，所述的固定盘在附图中为上蜗轮[5]、下蜗轮[6]，转动盘[7]的轴心处固定有转动轴[4]，转动轴[4]与固定盘之间可转动连接，所述的固定盘上固定有相间隔的第一电接点[11]、第二电接点[12]，簧片[8]的一端部固定在其中的一个电接点上并与该电接点形成电连接，簧片[8]的中部依靠弹力抵压在转动盘[7]的圆周边缘上，簧片[8]的另一端部与另一个电接点有两种工作位置，第一工作位置是簧片[8]的另一端部与另一个电接点相接触，第二工作位置是簧片[8]的另一端部与另一个电接点相分离；所述的转动盘[7]的圆周边缘上设有径向的凸起或凹陷（附图中为凹陷的缺口[9]），在簧片[8]的中部遇到所述的凸起或凹陷时，所述的簧片[8]的另一端部的工作位置发生变换。

所述的转动盘[7]的圆周边缘上设有一个凹陷的缺口[9]，所述的簧片[8]的中部为与凹陷缺口相吻合的凸起状，在簧片[8]的另一端部与另一个电接点相接触时，所述的簧片[8]的中部上的凸起陷入所述的凹陷内，在转动盘[7]继续转动时，转动盘[7]的外圆周顶开簧片[8]，使得簧片[8]的另一端部与另一个电接点相分离。

所述的固定盘有两个，分上下两层同轴设置；蜗杆也为两个，分别与两个固定盘相啮合。两个固定盘分别控制车库开门器的开门位置和关门位置。所述的固定盘为上下两层蜗轮，包括上蜗轮[5]、下蜗轮[6]，所述的两个蜗轮分别啮合在上蜗杆[3]和下蜗杆[2]上，所述的各个蜗杆枢轴设置于基架[1]上，而转动轴[4]也与该基架[1]枢轴连接。分别调节上蜗杆[3]和下蜗杆[2]与上蜗轮[5]、下蜗轮[6]的啮合位置，可以调节行程开关在开门和关门两个位置的限位位置，并且两个行程开关设置于一起，调节容易。

说 明 书 附 图

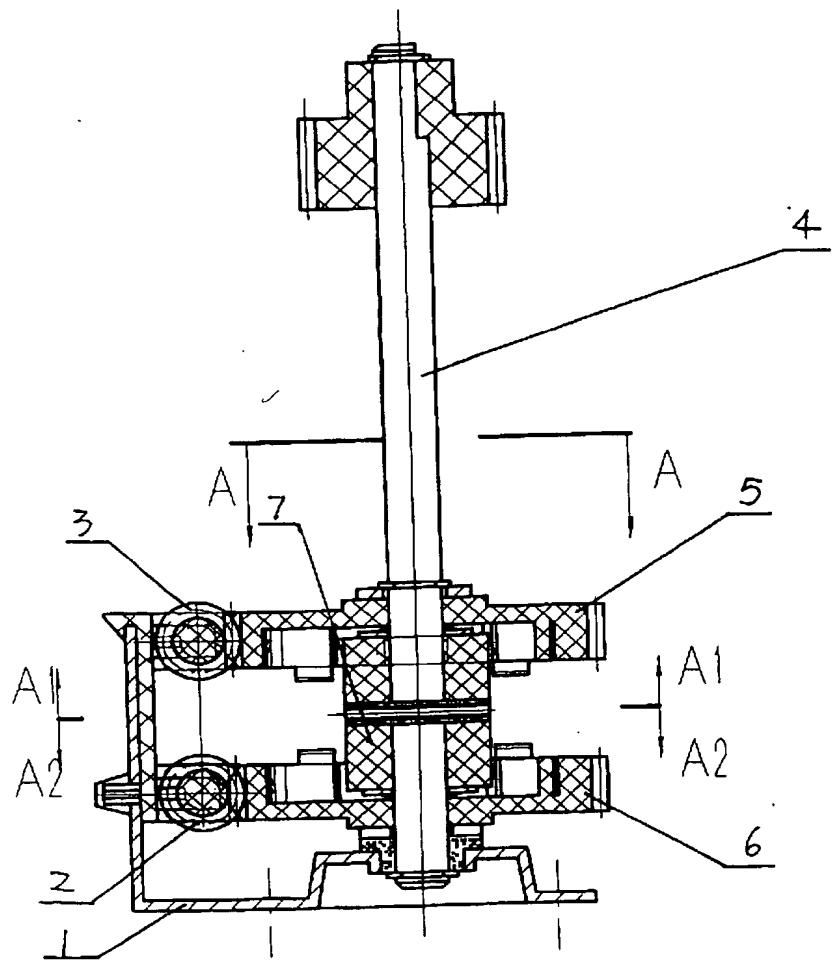
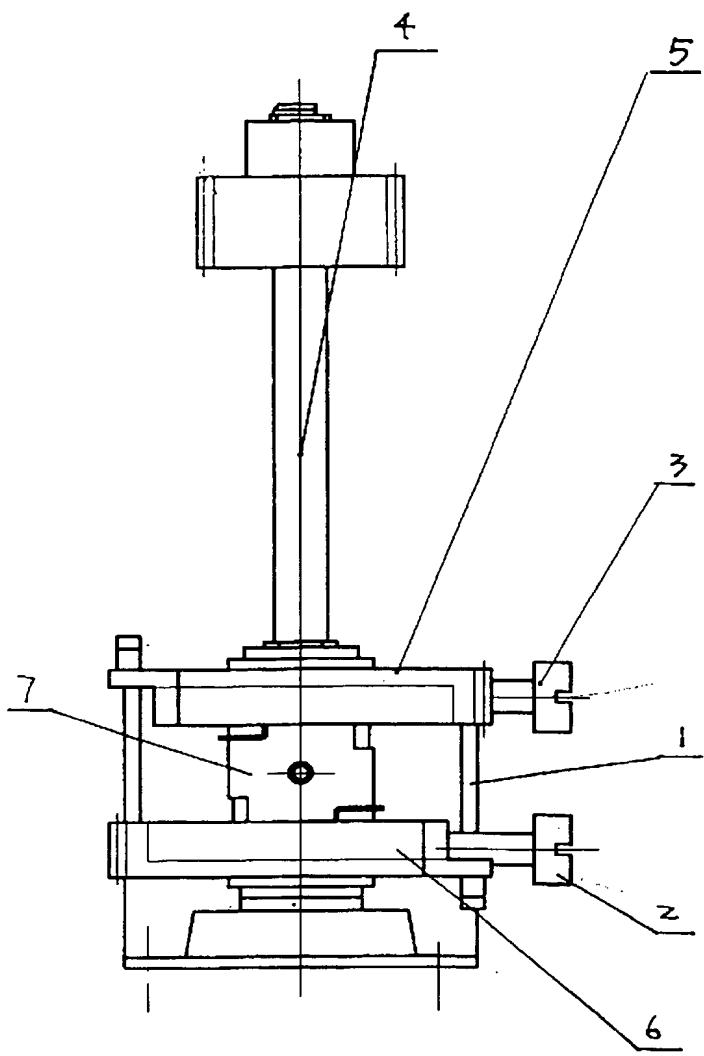


图 1



图二

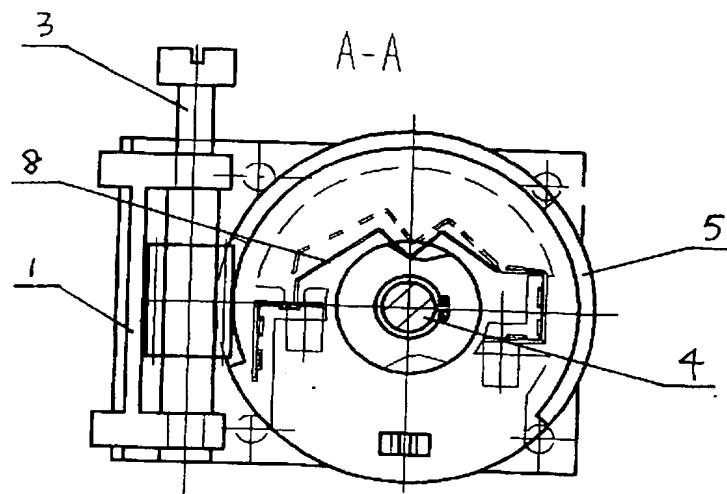


图 3

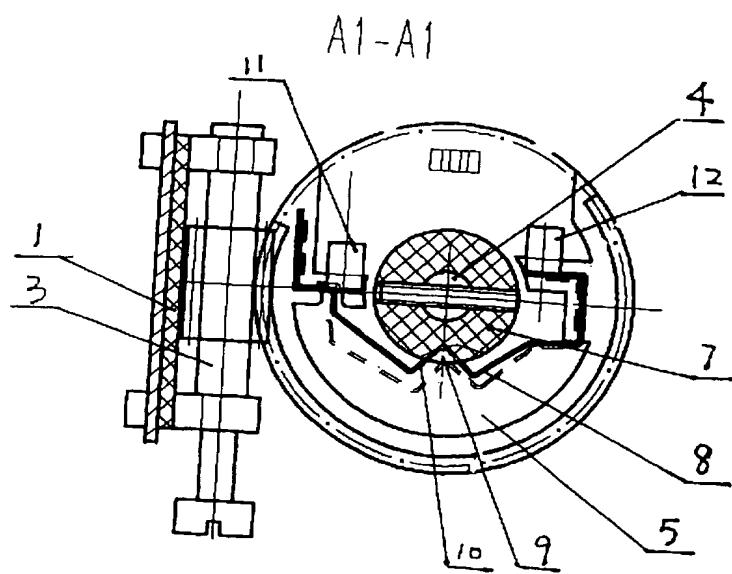


图 4

A₂-A₂

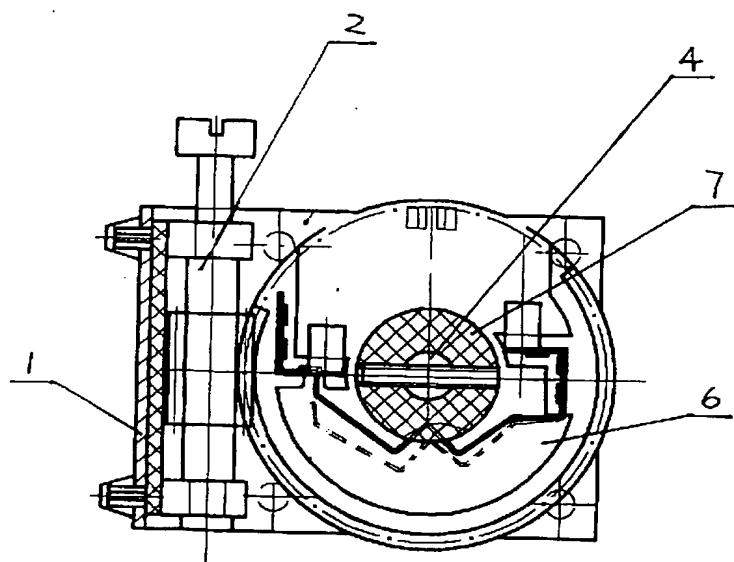


图 5

Patent Business Agency (Suzhou)

Registered agency in China National Intellectual Property Office (Bureau)
Floor 1st, Technological Building
91 Renmin Road, 215002 Suzhou, China

UDL LEEDS
15 SEP 2003

Certification

The attachment of the certification is the copy of the following patent application which has been submitted to our bureau:

Filing Date: Sep. 10, 2002
Application No.: 02 2 64324.9
Type of the invention: Utility
Title: A switch for controlling range of movement
Applicant: Positec Power Tools (Suzhou) Co., Ltd.
Inventor: Shaodong Chen

Approved by:

Mr. Wang Rongchuan

The president of State Intellectual Property Bureau
Of P.R.China
Jun. 25, 2003

Translated and witness by

Mr. Sun Fangwei

The attorney of Patent Business Agency (Suzhou)
Aug. 7, 2003



The title of the patent in Chinese application:

A switch for controlling range of movement

Applicant:

Positec Power Tools (Suzhou) CO., LTD

Name of the Inventor:

Shaodong Chen

Application Number:

02264324.9

Filing Date:

Sep. 10, 2002

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A Switch for Controlling Range of Movement

Field of the invention

The present invention relates to a switch for controlling range of movement which is used for a garage door.

Background of the invention

In the existing arts, US4147073 discloses that a reversible motor drives a main screw to rotate reversibly, the main screw drives the nut slider to axially move. The slider is connected to the garage door. A second screw is coaxially connected to the main screw and the screw-pitch thereof is small. The switch actuator on the second screw only axially moves to make the garage door move up and down, resulting in opening and closing the garage door. US5299678 discloses an adjustable limit switch mechanism to control the operation of an electric motor of a garage door opener to make the garage door move in a selected range. The switch mechanism comprises a screw driven by the electric motor, and at least one switch actuator is disposed on the screw and is adjustably positionable. When the screw rotates, the switch actuator does not rotate with the screw and only moves axially. A limit switch is adjacent to the screw so that when the screw rotates, the switch actuator axially moves on the screw to actuate the limit switch, thereby obtaining the motor to operate or stop. These two switch mechanisms each are remotely disposed at the two ends of the screw, so the range of movement is difficult to adjust. Furthermore, the two switch mechanisms are linear switches, they can not directly control the range of movement of the screw.

Summary of the invention

The object of the present utility is to provide a switch for controlling the range of the movement which may directly control the position of the range of movement by rotating.

The technology of the present utility: A switch for controlling range of movement comprises a fixed plate and a rotatable plate. A rotatable shaft is fixed at an axis center of the rotated plate, and roatably connected to the fixed plate. The fixed plate fixes a first electrolinking point and a second electrolinking point which are spaced apart from each other with a certain distance. One end of a spring plate is fixed to one of the electrolinking points, a middle portion of the spring plate is abutted against a circumferential edge of the rotated plate, and the other end of the spring plate has two working positions with respect to the other electrolinking point, one working position is that the other end of the spring plate contacts with the other electrolinking point, and the other working position is that the other end of the spring plate disconnects from the other electrolinking point. A circumferential edge of the ratable plate forms a radial projection or hollow. When the middle portion of the spring plate contacts with the projection or the hollow, the working position of the other end of the spring plate is changed.

The advantage of the present utility with respect to the prior arts:

The relative position of the rotatable plate and the fixed plate is changed by rotating the rotatable shaft, so that the first electrolinking point is connected to or detached from the second electrolinking point, thereby realizing the function of the switch for controlling range of movement, and applicable for rotatably limiting the range of movement.

Brief description of the drawings

Fig. 1 is a main cross-sectional view of the structure of the present utility;

Fig. 2 is a right view of the appearance of the present utility;
Fig. 3 is a cross-sectional view taken along line A-A of Fig. 1;
Fig. 4 is a cross-sectional view taken along line A1-A1 of Fig. 1;
Fig. 5 is a cross-sectional view taken along line A2-A2 of Fig. 1;
[1] base, [2] lower worm, [3] upper worm, [4] rotatable shaft, [5] upper turbine, [6] lower turbine, [7] rotatable plate [8] spring plate, [9] cutout, [10] projection, [11] first electrolinking point, [12] second electrolinking point

Detailed description of the invention

Referring to the drawings, a switch for controlling range of movement comprises a fixed plate, a rotated plate 7. The fixed plate shown in the drawings is an upper turbine 5 and a lower turbine 6. A rotatable shaft 4 is fixed at the axis center of the rotated plate 7, and is roatably connected to the fixed plate. The fixed plate fixes a first electrolinking point 11 and a second electrolinking point 12 which are spaced apart from each other with a certain distance. One end of a spring plate 8 is fixed and electrically connected to one of the electrolinking points 11 and 12. The middle portion of the spring plate 8 is abutted against a circumferential edge of the rotated plate, and the other end of the spring plate 8 has two working positions with respect to the other electrolinking point 11 or 12, one is the other end of the spring plate 8 contacts with the other electrolinking point, and the other is the other end of the spring plate 8 disconnect from the other electrolinking point. The circumferential edge of the rotatable plate 7 has a radial projection or hollow (a cutout 9 shown in drawings). When the middle portion of the spring plate 8 contacts with the projection or the hollow, the working position of the other end of the spring plate 8 is changed.

The circumferential edge of the rotatable plate 7 defines a depressed cutout 9. The middle portion of the spring plate 8 is a projection anastomosing with the cutout 9. When the other end of the spring plate 8 contacts with the other electrolinking point, the projection of the middle portion of the spring plate 8 engages with the cutout. When the rotatable plate 7 continues to rotate, the outer circumference of the rotatable plate 7 pushes the spring plate 8 out so that the other end of the spring plate 8 disconnects from the other electrolinking point.

There are two fixed plates which are disposed coaxially. There are also two worms to engage with the two fixed plates. The two fixed plates control the opening position and closing position of the garage door, respectively. The fixed plate includes the upper and lower turbines 5, 6 which are respectively engaged with the upper worm 3 and the lower worm 2. The upper and lower worms are pivotally disposed on the base 1, and the rotatable plate 4 is pivotally connected to the base 1. Respectively adjust the engaged positions of the upper worm 3 and the upper turbine 5, and the lower worm 2 and the lower turbine 6, then adjust the two limit positions of the switch for controlling range of movement when opening and closing the garage door. Furthermore, the two switches are arranged together, they are adjusted easily.

Claims

1. A switch for controlling range of movement, characterized in: the switch comprising a fixed plate and a rotatable plate, a rotatable shaft fixed at an axis center of the rotated plate, and roatably connected to the fixed plate, the fixed plate securing a first electrolinking point and a second electrolinking point which are spaced apart from each other with a certain distance, one end of a spring plate being fixed to one of the electrolinking points, a middle portion of the spring plate abutted against a circumferential edge of the rotated plate, and the other end of the spring plate having two working positions with respect to the other electrolinking point, one working position being that the other end of the spring plate contacts with the other electrolinking point, and the other working position being that the other end of the spring plate disconnects from the other electrolinking point, a circumferential edge of the rotatable plate having a radial projection or hollow, when the middle portion of the spring plate contacts with the projection or the hollow, the working position of the other end of the spring plate being changed.

2. The switch as claimed in claim 1, characterized in: a circumferential edge of the rotatable plate defines a depressed cutout, and a middle portion of the spring plate forms a projection anastomosing with the cutout, when the other end of the spring plate contacts with the other electrolinking point, the projection of the middle portion of the spring plate 8 engages with the cutout.

3. The switch as claimed in claim 1, characterized in: the fixed plate is a turbine which is engaged with a worm, said worm is pivotally disposed on the base, and the rotatable shaft is also pivotally connected to the base.

4. The switch as claimed in claim 3, characterized in: the

number of the fixed plates is two which are coaxially disposed up and down; the number of the worms is two which are respectively engaged with the fixed plates.